

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

RE: CITATION OF REFERENCES

It is noted that the Tamba reference cited in the Office Action as US 20030080885 A1 (corresponding to USP 7,161,514) has not been listed on the Notice of References Cited (PTO-892). In addition, the Fernandez reference, US 20060250288 A1, mentioned at page 3 of the Office Action is also not listed on the PTO-892. Accordingly, it is respectfully requested that the Examiner issue a corrected/complete PTO-892.

RE: THE ALLOWABLE SUBJECT MATTER

The Examiner's indication of the allowability of the subject matter of claims 2, 3, 6, 7, 12, 13, 16 and 17 is respectfully acknowledged. These claims, however, have not been rewritten in independent form at this time since, as set forth in detail hereinbelow, it is respectfully submitted that their respective parent claims also recite allowable subject matter.

THE CLAIMS

Claims 1-21 have been amended only to make some minor grammatical improvements and to correct some minor antecedent basis problems so as to put the claims in better U.S. form. No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered. It is respectfully submitted, moreover, that the amendments to the claims are not related to patentability, and do not narrow the scope of the claims either literally or under the doctrine of equivalents.

THE PRIOR ART REJECTION

Claims 1, 4, 5, 8-11, 14, 15 and 18-21 were rejected under 35 USC 103 as being unpatentable over JP 2004-328436 ("Sekiya") in view of US 20030080885 A1 ("Tamba"). This rejection, however, is respectfully traversed.

The present invention as recited in independent claim 1 is directed to a time-interleaved analog-to-digital converter including a plurality of analog-to-digital converters, a signal generator configured to output a calibration signal that includes a plurality of signal components positioned, respectively, at desired frequencies, and a correction information calculating unit which calculates an amplitude and a phase of each of the

plurality of signal components by carrying out a spectrum analysis with respect to signals output by the analog-to-digital converters to receive the predetermined calibration signal output from the signal generator. The correction information calculating unit also newly obtains the correction information based on a result of calculation, and updates contents of a correction information memory in accordance with the newly obtained correction information.

The present invention as recited in independent claim 11 is directed to a signal processing system including a time-interleaved analog-to-digital converter having the features described above with respect to claim 1, and a signal processing device which executes a predetermined signal processing in response to an analog-to-digital converted output signal from the time-interleaved analog-to-digital converter.

Significantly, according the present invention as recited in each of independent claims 1 and 11, the calibration signal generated by the signal generator includes a plurality of signal components positioned at desired frequencies, and each of these signal components is processed by the correction information calculating unit, i.e., by calculating an amplitude and phase of each signal component using spectrum analysis. And it is respectfully submitted that neither Sekiya nor Tamba discloses,

teaches or suggests these features of the present invention as recited in each of independent claims 1 and 11.

As recognized by the Examiner, Sekiya discloses an arrangement of analog-to-digital converters. However, as acknowledged by the Examiner, Sekiya does not disclose a signal generator and a correction information calculating unit.

Tamba discloses an interleaving analog-to-digital converter in which, during calibration, a calibration value for each analog-to-digital converter is obtained from a calibration memory 134 and set in a delay element 116, 118 by a calculation unit 132 (see paragraph 0031). In Tamba, although there appear to be multiple calibration values for a plurality of frequencies, only a single one of these calibration values corresponding to the input frequency is selected or calculated and set in each delay element (again, see paragraph 0031). Calculation unit 132 then uses the singular calibration value and sine curve fitting to estimate the sine wave used in the calibration from the waveform data to thereby determine errors in the gain, offset and phase (see paragraph 0027). As such, a single sine wave having a single frequency, selected from among a plurality of frequencies, is used during calibration.

In contrast to the claimed present invention, Tamba does not disclose processing a calibration signal including a plurality of

signal components using, for example, sine curve fitting. More specifically, Tamba fails to disclose a signal generator which outputs a calibration signal that includes a plurality of signal components positioned at desired frequencies, and Tamba fails to disclose processing such signal components by means of a correction information calculating unit, wherein the processing comprises calculation of an amplitude and phase of each signal component using spectrum analysis. Instead, Tamba merely discloses processing only a single one of the frequencies of the sine wave during calibration using sine curve fitting.

Accordingly, it is respectfully submitted that even if the teachings of Sekiya and Tamba were combinable in the manner suggested by the Examiner, such combination would still not achieve or render obvious the structure of the present invention as recited in independent claims 1 and 11.

In view of the foregoing, it is respectfully submitted that independent claims 1 and 11, and each of claims 2-10 and 12-21 depending respectively therefrom, all clearly patentably distinguish over Sekiya and Tamba under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

Application Serial No. 10/590,752
Response to Office Action

Customer No. 01933

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned for prompt action.

Respectfully submitted,

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